IS DBS BETTER THAN BOTULINUM TOXIN IN PRIMARY DYSTONIA?

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DBS is better than botulinum toxin in primary dystonia. Dystonia is the third most common movement disorder after essential tremor and Parkinson's disease. There are several varieties of dystonia, including generalized dystonia, cervical dystonia (spasmodic torticollis), oromandibular dystonia, laryngeal dystonia (spasmodic dysphonia), blepharospasm, and idiopathic cranial-cervical dystonia (Meige syndrome). The location of the affected muscle groups corresponds to the associated symptoms and functional impairments. The mainstay of treatment for focal or segmental dystonias has been intramuscular injection of botulinum toxin every 3 to 6 months. For generalized dystonia, there has been no specific therapy of choice; however, benzodiazepines and baclofen have been used with varying results. In the 1950's and 1960's, brain lesioning procedures were occasionally performed for dystonia. These procedures entail guiding an electrode tip to a target deep inside the brain and delivering heat to the targeted brain tissue to create a permanent brain lesion with the hopes of eliminating the abnormal firing of brain cells. Although lesioning procedures often showed benefit, the main drawback is permanent damage to brain tissue not associated with dystonia leading to unpredictable consequences. Deep brain stimulation (DBS) has emerged as a promising surgical alternative to treat dystonia, mimicking or improving on the benefits of the lesioning procedures without causing brain damage.

The main risks of DBS are bleeding (3%) and infection (4%), and there is also a risk of hardware malfunction requiring replacement. Frequent programming visits to configure the stimulation settings are often necessary to maximize benefits. While the risks of surgery are important, the benefits of DBS are that the entire system is removable and does not cause brain tissue damage.

Improvement in dystonia patients after DBS implantation can be measured by scales such as the Burke-Fahn-Marsden dystonia rating scale (BFMDRS). The BFMDRS is a 120-point scale to rate the severity of dystonia in 9 different body regions (a higher score is worse). Current studies have shown considerable positive long-term improvement in patients with DBS using rating scales such as the BFMDRS. An average of 50-60% reduction in BFMDRS scores have been shown in patients with bilateral GPi DBS, which is a substantial improvement for patients with severe symptoms. In general, current data indicates that DBS appears to be more favorable for patients with generalized dystonia than those with secondary dystonias (*e.g.* caused by stroke).

In comparison to chronic treatment with botulinum toxin, DBS is a better treatment for primary dystonia for the following reasons: (1) strong clinical studies showing improvements in BFMDRS scores and outcome scales; (2) durable improvements and long-term effect *vs.* short-term effect of botulinum toxin injections; (3) lack of tolerance and BoNT antibodies that can develop with botulinum toxin; (4) lack of muscle weakness; (5) increased patient comfort; (6) adjustability; (7) likelihood of lower lifetime cost.

Therefore, DBS is better than botulinum toxin in primary dystonia.